WHAT IS CLAIMED IS:

1. A method for adaptive data transmission in a communication system which has a plurality of sending communication means and receiving communication means using a shared channel and a dedicated channel, said method comprising the steps of:

(a1) receiving in the receiving communication means data transmitted from the plurality of sending communication means using the dedicated channel;

(b1) when the data are received, obtaining an idle capacity which is not being used from the maximum transmission capacity which is already allocated to the plurality of sending communication means using the dedicated channel; and

(c1) when the idle capacity is obtained, broadcasting shared channel information about the idle capacity to the plurality of sending communication means which use the shared channel, and later transmitting in the sending communication means the data according to the shared channel information,

whereby when the plurality of sending communication means transmit the data by using the dedicated channel via variable transmission rate services, the variation rate of the transmission rates of the variable transmission rate data transmission services transmitted from the sending communication means is controlled so that the idle transmission capacity can be forecasted for use in other service data transmission.

2. The method for adaptive data transmission according to claim 1, wherein said step of (a1) receiving in one of the receiving communication means, when the plurality of sending communication means using the dedicated channel transmits the data via the variable transmission rate service, has the steps of:

(a2) calculating the average movement value and standard movement deviation

value of transmission data traffic according to unit time t about variable transmission rate service session subjected to transmission, in response to a data transmission request of a user;

(b2) forecasting the traffic in the next unit time $t+1$ by using the calculated average movement value and standard movement deviation value;

(c2) obtaining a control transmission rate via the forecasted data traffic, wherein the control transmission rate guarantees a transmission rate between the minimum transmission rate and the maximum transmission rate; and

(d2) transmitting the data within the obtained control transmission rate.

3. The method for adaptive data transmission according to claim 2, wherein said step (b2) of forecasting traffic uses the following equation:

$$R_i^P(t+1) = M_i(t) + \alpha\left(\sigma_i(t)\right)^\beta + \gamma,$$

wherein, $R_i^P(t+1)$ is the forecasted traffic value,

$M_i(t)$ is the average movement value,

$\sigma_i(t)$ is the standard movement deviation value, and

α, β and γ mean a variable, respectively.

4. The method for adaptive data transmission according to claim 2, wherein said step (c2) of obtaining control transmission rate uses the following equation:

$$R_i^C(t+1) = \min[\max[R_i^P(t+1), R_i^S], R_i^M],$$

wherein, $R_i^C(t+1)$ is the control transmission rate,

$R_i^P(t+1)$ is the forecasted traffic value,

R_i^S is the minimum transmission rate of session i, and

R_i^M is the maximum transmission rate of session i.

5. The method for adaptive data transmission according to claim 2, wherein said step (d2) of transmitting the data, if some of the data are not transmitted at present, has the step of storing the data in a transmission queue or canceling the same according to corresponding QoS.

6. The method for adaptive data transmission according to claim 1, wherein said step (b1) of obtaining an idle capacity has the steps of:

(a3) forecasting the traffic of the data received from the sending communication means using the dedicated channel;

(b3) obtaining a control transmission rate via the forecasted data traffic, wherein the control transmission rate is between the minimum transmission rate and the maximum transmission rate; and

(d3) obtaining an idle allowable transmission rate which is not being used from the maximum capacity allowed to the plurality of sending side by using the control transmission rate.

7. The method for adaptive data transmission according to claim 6, wherein said step (a3) of obtaining a control transmission rate has the steps of:

measuring the amount of the data received during unit time according to the session using the variable transmission rate service, when the data is received during unit time t; and

forecasting the traffic value of the next unit time t+1 about the variable transmission rate service session based upon the measured amount of the data.

8. The method for adaptive data transmission according to claim 7, wherein said step (a3) of measuring the amount of the data has the steps of:

calculating the average movement of the transmission data traffic of the unit time t about the variable transmission rate service; and

obtaining the standard movement deviation about the average movement value.

9. The method for adaptive data transmission according to claim 7, wherein said step of forecasting the traffic value uses the equation:

$$R_i^P(t+1) = M_i(t) + \alpha(\sigma_i(t))^\beta + \gamma,$$

wherein, $R_i^P(t+1)$ is the forecasted traffic value,

$M_i(t)$ is the average movement value,

$\sigma_i(t)$ is the standard movement deviation value, and

α, β and γ mean a variable, respectively.

10. The method for adaptive data transmission according to claim 6, wherein said step (b3) of obtaining the control transmission rate uses the equation:

$$R_i^C(t+1) = \min[\max[R_i^P(t+1), R_i^S], R_i^M],$$

wherein, $R_i^C(t+1)$ is the control transmission rate,

$R_i^P(t+1)$ is the forecasted traffic value,

R_i^S is the minimum transmission rate of session i, and

R_i^M is the maximum transmission rate of session i.

11. A method for adaptive data transmission according to claim 6, wherein said step (c3) of obtaining an unused idle allowable transmission rate uses the equation:

$$Q(t+1) = C - \sum_{j=1}^{N} R_j^C(t+1),$$

wherein $Q(t+1)$ is the idle allowable transmission rate,

C is the maximum capacity allowed to the sending side,

N is number of the current variable transmission rate sessions, and

$R_j^C(t+1)$ is the control transmission rate.

12. A method for adaptive data transmission according to claim 1, wherein the shared channel information transmitted in said step (c1) of broadcasting and transmitting includes transmission rates according to the channel and number of channels according to the transmission rate of the shared channel.

13. The method for adaptive data transmission according to claim 1, wherein the transmitting the data in the sending communication means in said step (c1) of broadcasting and transmitting has the steps:

(a4) transmitting data according to the available shared channel information of the current unit time t received from the receiving communication means in response to the data transmission request of the user; and

(b4) storing some data which were not transmitted in said step (b1) of transmitting data to a transmission queue in the sending communication system or canceling the same according to corresponding QoS;

wherein the allowable transmission rate of the next unit time is received from the receiving communication system in the termination point of each unit time in said step (a1).

14. A method for adaptive data transmission in a plurality of sending communication

means, in a communication system which has the sending communication means and receiving communication means using a shared channel and a dedicated channel, said method comprising the steps of:

(a5) calculating the average movement and the standard movement deviation of a transmission data traffic per unit time t about variable transmission rate service session to be transmitted, in response to a data transmission request of a user;

(b5) forecasting the traffic in the next unit time t+1 by using the calculated average movement value and the standard movement deviation value;

(c5) obtaining a control transmission rate guaranteeing a value between the minimum and maximum transmission rates via the calculated data traffic; and

(d5) transmitting data within the obtained control transmission rate;

whereby when the plurality of sending communication means transmit the data via variable transmission rate services by using the dedicated channel, the variation rate of the transmission rates of variable transmission rate data transmission services is controlled so that the receiving communication means can forecast the idle transmission capacity.

15. The method for adaptive data transmission in a plurality of sending communication means according to claim 14, wherein said step (b5) of forecasting the traffic uses the equation:

$$R_i^P(t+1) = M_i(t) + \alpha(\sigma_i(t))^\beta + \gamma,$$

wherein, $R_i^P(t+1)$ is the forecasted traffic value,

$M_i(t)$ is the average movement value,

$\sigma_i(t)$ is the standard movement deviation value, and

α, β and γ mean a variable, respectively.

16. The method for adaptive data transmission in a plurality of sending communication means according to claim 14, wherein said step (c5) of obtaining a control transmission rate uses the equation:

$$R_i^C(t+1) = \min[\max[R_i^P(t+1), R_i^S], R_i^M],$$

wherein, $R_i^C(t+1)$ is the control transmission rate,

$R_i^P(t+1)$ is the forecasted traffic value,

R_i^S is the minimum transmission rate of session i, and

R_i^M is the maximum transmission rate of session i.

17. A method for adaptive data transmission in a plurality of sending communication means according to claim 14, wherein said step (d5) of transmitting data, if some of the data are not transmitted at present, has the step of storing the data in a transmission queue or canceling the same according to corresponding QoS.

18. A method for adaptive data transmission in receiving communication means in a communication system which has a plurality of sending communication means and receiving communication means using a shared channel and a dedicated channel, said method comprising the steps of:

(a6) forecasting the traffic of data received from the sending communication means using the dedicated channel;

(b6) obtaining a control transmission rate guaranteeing a value between the minimum and maximum transmission rates via the forecasted data traffic;

(c6) obtaining an idle allowable transmission rate which is not being used from the maximum capacity allowed to the plurality of sending side by using the obtained

control transmission rate; and

(d6) when the idle capacity is obtained, broadcasting shared channel information about the idle capacity to the plurality of sending communication means which use the shared channel, and later transmitting in the sending communication means the data according to the shared channel information,

whereby when the plurality of sending communication means transmit the data via the dedicated channel via variable transmission rate services, the idle transmission capacity which is not being used in the maximum capacity already allocated to the dedicated channel of the sending communication means can be forecasted for use in transmitting other service data.

19. The method for adaptive data transmission in receiving communication means according to claim 18, wherein said step (a6) of obtaining a control transmission rate has the steps of:

(a7) measuring the amount of the data received during unit time according to the session using the variable transmission rate service, when the data is received during unit time *t*; and

(b7) forecasting the traffic value of the next unit time t+1 about the variable transmission rate service session based upon the measured amount of the data.

20. The method for adaptive data transmission in receiving communication means according to claim 19, wherein said step (a7) of measuring the amount of the data has the steps of:

calculating the average movement of the transmission data traffic of the unit time *t* about the variable transmission rate service; and

obtaining the standard movement deviation about the average movement value.

21. The method for adaptive data transmission in receiving communication means according to claim 19, wherein said step (b7) of forecasting the traffic value uses the equation:

$$R_i^P(t+1) = M_i(t) + \alpha\left(\sigma_i(t)\right)^\beta + \gamma,$$

wherein, $R_i^P(t+1)$ is the forecasted traffic value,

$M_i(t)$ is the average movement value,

$\sigma_i(t)$ is the standard movement deviation value, and

α, β and γ mean a variable, respectively.

22. The method for adaptive data transmission in receiving communication means according to claim 18, wherein said step (b6) of obtaining a control transmission rate uses the equation:

$$R_i^C(t+1) = \min[\max[R_i^P(t+1), R_i^S], R_i^M],$$

wherein, $R_i^C(t+1)$ is the control transmission rate,

$R_i^P(t+1)$ is the forecasted traffic value,

R_i^S is the minimum transmission rate of session i, and

R_i^M is the maximum transmission rate of session i.

23. The method for adaptive data transmission in receiving communication means according to claim 18, wherein said step (c6) of obtaining an idle allowable transmission rate uses the equation:

$$Q(t+1) = C - \sum_{j=1}^{N} R_j^C(t+1),$$

wherein $Q(t+1)$ is the idle allowable transmission rate,

C is the maximum capacity allowed to the sending side,

N is number of the current variable transmission rate sessions, and

$R_j^C(t+1)$ is the control transmission rate.

24. The method for adaptive data transmission in receiving communication means according to claim 18, wherein the shared channel information transmitted in said step (c6) of broadcasting and transmitting includes transmission rates according to the channel and number of channels according to the transmission rate of the shared channel.

25. A method for adaptive data transmission in sending communication means, in a communication system which has the sending communication means and receiving communication means using a shared channel and a dedicated channel, said method comprising the steps of:

(a8) receiving dedicated channel information transmitted from the receiving communication means;

(b8) transmitting data according to the available shared channel information in the received current unit time t in response to a data transmission request from a user; and

(c8) if some of the data are not transmitted at present as a result of said step (b) of transmitting data, storing the data in a transmission queue or canceling the same according to corresponding QoS,

wherein the allowable transmission rate of the next unit time is received from the receiving communication system in the termination point of each unit time in said step (a8),

whereby the idle transmission capacity which is not being used from the

maximum allocation capacity already allocated to the sending communication means using the dedicated channel can be used to transmit the data by using the shared channel information transmitted from the receiving communication means.

26. An apparatus for adaptive data receiving in a communication system having a plurality of sending communication means and receiving communication means which use a shared channel and a dedicated channel, said apparatus comprising:

a receiver module for receiving data per unit time *t*, the data being transmitted from one sending communication means using a variable transmission rate service via the dedicated channel and the other sending communication means using an idle capacity utilization service via the shared channel;

a received traffic calculating module for calculating a traffic received during the unit time only about each of variation transmission service sessions of the data received per unit time;

a data traffic forecasting module for calculating and forecasting the amount of data traffic in the next unit time based upon the value calculated in the received traffic calculation module about the each of the variable transmission rate service sessions, and obtaining a control transmission rate which guaranteeing a value between the minimum and maximum transmission rates via the calculated forecasting data traffic;

a shared channel module for calculating an idle allowable transmission rate about idle capacity utilization service sessions of the unit time based upon the control transmission rate value about the services in said data traffic forecasting module; and

a transmitter module for transmitting the allowable transmission rate to the sending communication means using the idle capacity utilization transmission service via the shared channel,

whereby when the plurality of sending communication means transmit the data by using the dedicated channel via variable transmission rate services, the idle transmission capacity which is not being used in the maximum capacity already allocated to the dedicated channel of the sending communication means can be forecasted for use in other service data transmission.

27. The apparatus for adaptive data receiving in a communication system according to claim 26, wherein said received traffic calculating module calculates the received traffic by calculating the average movement of the transmission data traffic of the unit time t about the variable transmission rate service, and then obtaining the standard movement deviation about the average movement value.

28. The apparatus for adaptive data receiving in a communication system according to claim 26, wherein said data traffic forecasting module forecasts the traffic from the equation:

$$R_i^P(t+1) = M_i(t) + \alpha\left(\sigma_i(t)\right)^\beta + \gamma,$$

wherein, $R_i^P(t+1)$ is the forecasted traffic value,

$M_i(t)$ is the average movement value,

$\sigma_i(t)$ is the standard movement deviation value, and

α, β and γ mean a variable, respectively.

29. The apparatus for adaptive data receiving in a communication system according to claim 26, wherein said data traffic forecasting module obtains the control transmission rate from the equation:

$$R_i^C(t+1) = \min[\max[R_i^P(t+1), R_i^S], R_i^M],$$

wherein, $R_i^C(t+1)$ is the control transmission rate,

$R_i^P(t+1)$ is the forecasted traffic value,

R_i^S is the minimum transmission rate of session i, and

R_i^M is the maximum transmission rate of session i.

30. The apparatus for adaptive data receiving in a communication system according to claim 26, wherein said shared channel module calculates the idle allowable transmission rate from the equation:

$$Q(t+1) = C - \sum_{j=1}^{N} R_j^C(t+1),$$

wherein $Q(t+1)$ is the idle allowable transmission rate,

C is the maximum capacity allowed to the sending side,

N is number of the current variable transmission rate sessions, and

$R_j^C(t+1)$ is the control transmission rate.

31. An apparatus for adaptive data transmission in a communication system having sending communication means and receiving communication means which use a shared channel and a dedicated channel, said apparatus comprising:

a receiver module for receiving shared channel information transmitted from the receiving communication means;

a transmission controller module for controlling a transmission scheduler module based upon the shared channel information received from the receiving communication means;

a transmission scheduler module for storing transmitting data in a transmission queue according to a data transmission request from a user, and sending the data to a

transmitter module in response to a control signal from said transmission controller module; and

a transmission module for modulating the data received from said transmission scheduler module, diffusing the data into a value corresponding to the pertinent shared channel subjected to transmission, and transmitting the diffused data to the receiving communication system,

whereby the idle transmission capacity which is not being used from the maximum allocation capacity already allocated to the sending communication means using the dedicated channel can be used to transit the dat by using the shared channel information transmitted from the receiving communication means.

32. The apparatus for adaptive data transmission in a communication system having a plurality of sending communication means and receiving communication means which use a shared channel and a dedicated channel, said apparatus comprising:

a receiver module for receiving a confirmation signal about a variable transmission rate service session setting and a QoS request;

a transmission controller module for calculating the amount of a transmittable data traffic during the next unit time and forecasting the data traffic thereof based upon the amount of data transmitted during unit time, calculating a control transmission rate which guarantees a value between the minimum and maximum rates via the calculated forecasting data traffic, and then controlling data transmission from a transmission scheduler module according to the control transmission rate;

a transmission scheduler module for storing transmitting data in a transmission queue according to a data transmission request from a user, and sending the data to a transmitter module in response to a control signal from said transmission controller

module; and

a transmitter module for modulating the data received from said transmission scheduler module and transmitting the modulated data to the receiving communication system via the corresponding dedicated channel,

whereby when the plurality of sending communication means transmit the data via variable transmission rate services by using the dedicated channel, the variation rate of the transmission rates of variable transmission rate data transmission services is controlled so that the receiving communication means can forecast the idle transmission capacity.

33. The apparatus for adaptive data transmission in a communication system according to claim 32, wherein said transmission controller module calculates the transmittable traffic by calculating the average movement of the transmission data traffic of the unit time t about the variable transmission rate service, and then obtaining the standard movement deviation about the average movement value.

34. The apparatus for adaptive data transmission in a communication system according to claim 32, wherein said transmission controller module uses the following equation when forecasting the transmittable data traffic during the next unit time according to the calculated amount of the traffic:

$$R_i^P(t+1) = M_i(t) + \alpha(\sigma_i(t))^\beta + \gamma,$$

wherein, $R_i^P(t+1)$ is the forecasted traffic value,

$M_i(t)$ is the average movement value,

$\sigma_i(t)$ is the standard movement deviation value, and

α, β and γ mean a variable, respectively.

35. The apparatus for adaptive data transmission in a communication system according to claim 32, wherein said transmission controller module calculates the control transmission rate from the following equation:

$$R_i^C(t+1) = \min[\max[R_i^P(t+1), R_i^S], R_i^M],$$

wherein, $R_i^C(t+1)$ is the control transmission rate,

$R_i^P(t+1)$ is the forecasted traffic value,

R_i^S is the minimum transmission rate of session i, and

R_i^M is the maximum transmission rate of session i.